

APPENDIX

SPECIFICATION PARAGRAPHS MARKED TO SHOW AMENDMENT(S) THERETO:

Paragraph beginning at page 7, line 10:

FIGURE 1 is a cross-section schematic diagram of a two-layer carrier structure comprising a carrier liner 10 and a cross-linkable adhesive layer 20. Carrier structures of the present invention may also include cross-linkable adhesive layers 20 comprising a combination of permanent tacky controlled peel strength adhesive and thermal-UV releasing adhesive within a single layer 20. Thus, differential peel strength is produced after thermal-UV exposure. The adhesive layer 20 first releases the chips or other objects carried and then releases the carrier base 10, enabling the replacement of adhesive layer 20 for reuse of typical carrier base 10. Such a combination adhesive preferably releases both chips and liner 10 without leaving a residue, and also preferably has greater adhesion to liner 10 than to the chip or other object carried so that the chip is released more easily than is the liner 10, i.e. it has a different release profile from the chip than from liner 10.

Paragraph beginning at page 12, line 18:

The second layer 30 of the adhesive laminate should be coated with a strong adhesive, e.g. about 100-5000 gm/inch, that will not be dramatically affected by thermal-UV or other radiation exposure. This second, non-curable adhesive layer 30 should be easily removable from the carrier base, so that the carrier base can be reused after application of a new adhesive laminate. Thus, second layer 30 has a different release profile than does first layer 20.

Paragraph beginning at page 18, line 3:

Alternatively and optionally, a cavity or window may be formed in a carrier structure 10 to allow energy (EMR) to pass through carrier base 15 to expose and cure the tacky layer 20 to achieve similar reduction of tackiness of the areas exposed. FIGURE 6 is an isometric schematic diagram of an exemplary embodiment of a carrier wherein a ledge 11 in the carrier structure 10 serves as a support for a radiation-transparent carrier base insert 15, upon which the adhesive layer 20 is disposed. Adhesive layer 20 may be any one of the two-layer, three-layer and four-layer embodiments described above. An object [50,] 60, such as a semiconductor chip or other electronic component is also shown in place on adhesive layer 20. Alternatively, a transparent rigid backing substrate 15 may be used. The desirable characteristics of such a backing substrate 15 include transparency to the EMR that is used to cure the tacky layer, preferably transparency to UV, microwave or e-beam radiation. Suitable rigid backing substrates 15 include, for example, inorganic glasses such as quartz, silicate glasses or organic glasses such as polycarbonate, polystyrene, and acrylic. Desirably the rigid backing substrate 15 is low enough in cost so that it is economically feasible to discard it after each use.

Paragraph beginning at page 18, line 19:

Also alternatively, and/or optionally, the laminate of adhesive layer 20 is protected from cross linking by UV light before the carrier structure is used by means of a UV barrier release liner 50. Typically, such release liner/cover 50 is placed over tacky layer 20 and over carrier base 15 to block EMR that would crosslink adhesive layer(s) 20 and will be removed from the UV curable tacky layer 20 prior to use. Such block may be restored or applied after the object 60 is placed on tacky layer 20 to block cross-linking EMR until such time as it is desired to release object [50] 60. The carrier base platform 15 may be removable or non-removable from the waffle pack, tape-and-reel, and JEDEC tray configuration, as is desired.

Paragraph beginning at page 20, line 1:

All of these high-surface-energy polymers may be used for baking out moisture, e.g., at about 150°C. If extended exposure to higher temperature of about 200-350°C for a few minutes must be used, the more useful polymers will be those of polyvinylidene fluoride or its copolymer. Some of block co-polymers such as Kraton G series made by Shell Chemical Company or similar thermoplastic elastomer resin with high temperature stable backbone may be used. Preferably the adhesive has a higher and more permanent adhesion to the carrier base film or liner 10 than to the items to be carried, i.e. has a different release profile to carrier base film or liner 10 than to the items, and that the adhesive layer 20 be of sufficient thickness (typically about 1-5 mil) to hold parts with slightly different flatness tolerances.

AMENDED CLAIMS MARKED TO SHOW AMENDMENT(S) THERETO:

1. (Amended) A re-usable carrier structure for carrying an article, comprising
a carrier base having at least a portion thereof transparent to electromagnetic radiation,
a surface of said carrier base having different surface properties from a surface of [said] the article, and
said carrier base being stable to resist deformation by heat at temperatures less than or equal to about 80°C; and
[an] a tacky adhesive layer disposed on said carrier base,
said adhesive layer being cross-linkable by electromagnetic radiation, by heat, or by both heat and electromagnetic radiation, for decreasing the adhesion thereof,
and
said adhesive layer after being cross-linked having a different release profile from [said] the surface of [said] the article than from [said] the surface of said carrier base, wherein the article may be removed leaving said adhesive layer adhering to said carrier base.
2. (Amended) The re-usable carrier structure of claim 1, wherein the carrier base [is one of] includes a waffle pack, a tray, a JEDEC tray, a tape-and-reel, [and] or a tape.

4. (Amended) The re-usable carrier structure of claim 1, wherein the adhesive layer is cross-linkable by heat, by UV radiation, or by both heat and UV radiation.
10. (Amended) A re-usable carrier structure comprising:
a carrier base, said carrier base having at least a portion thereof transparent to electromagnetic radiation, and
said carrier base being stable to resist deformation by heat at temperatures less than or equal to about 80°C; and
an adhesive laminate disposed on a surface of said carrier base, said adhesive laminate comprising:
an adhesive base;
a first adhesive layer disposed on a first surface of said adhesive base for removably connecting said carrier base and said adhesive base; and
a second adhesive layer disposed on a second surface of said adhesive base for providing a tacky carrier surface,
said second adhesive layer being cross-linkable by electromagnetic radiation, by heat, or by both heat and electromagnetic radiation, for decreasing the tackiness thereof,
wherein an article carried on the carrier surface is released when said second adhesive layer is cross-linked by electromagnetic radiation applied through the transparent portion of the carrier base, by heat, or by both heat and electromagnetic radiation.
11. (Amended) The re-usable carrier structure of claim 10, wherein the carrier base [is one of] includes a waffle pack, a tray, a JEDEC tray, a tape-and-reel, [and] or a tape.
13. (Amended) The re-usable carrier structure of claim 10, wherein the second adhesive layer is cross-linkable by heat, by UV radiation, or by both heat and UV radiation.
20. (Amended) A re-usable carrier structure comprising
a carrier base having at least a portion thereof transparent to electromagnetic radiation, and
said carrier base being stable to resist deformation by heat at temperatures less than or equal to about 80°C;
a first adhesive layer removably disposed on a surface of said carrier base; and
a second adhesive layer disposed on said first adhesive layer for providing a tacky carrier surface, and
said second adhesive layer being cross-linkable by electromagnetic radiation, by heat, or by both heat and electromagnetic radiation, for decreasing the tackiness thereof,
wherein an article carried on the carrier surface is released when said second adhesive layer is cross-linked by electromagnetic radiation applied through the transparent portion of the carrier base, by heat, or by both heat and electromagnetic radiation.

21. (Amended) The re-usable carrier structure of claim 20, wherein the carrier base [is one of] includes a waffle pack, a tray, a JEDEC tray, a tape-and-reel, [and] or a tape.
23. (Amended) The re-usable carrier structure of claim 20, wherein the second adhesive layer is cross-linkable by heat, by UV radiation, or by both heat and UV radiation.
30. (Amended) A re-usable carrier structure for carrying one or more objects, said re-usable carrier comprising:
a base layer,
wherein at least a portion of said base layer is transparent to electromagnetic radiation,
wherein said base layer is formed of a material that is stable at temperatures less than about 80°C; and
an adhesive layer disposed on said base layer for adhesively holding one or more objects,
wherein said adhesive layer becomes cross-linked upon exposure to electromagnetic radiation applied through the transparent portion of the base layer thereby to exhibit a reduction of adhesiveness,
wherein the reduction of adhesiveness to the one or more objects exceeds the reduction of adhesiveness to said base layer,
whereby one or more objects carried on said adhesive layer are released when said adhesive layer is cross-linked by exposure to electromagnetic radiation applied through the transparent portion of the base layer.